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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,134	12/17/2001	Marc Schrader	10191/1986	1915
26646	7590	06/08/2005	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			DEPPE, BETSY LEE	
			ART UNIT	PAPER NUMBER
			2637	

DATE MAILED: 06/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/914,134

Applicant(s) **UK**

SCHRADER ET AL.

Examiner

Betsy L. Deppe

Art Unit

2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 March 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 and 22-26 is/are allowed.
- 6) ☒ Claim(s) 13-17, 19-21 and 27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

1. The drawings were received on March 15, 2005. These drawings are not accepted because they do not comply with 37 CFR 1.84(l) and 1.84(p). The text is not at least 1/8 inch in height and may not be legibly reproduced.

### ***Response to Arguments***

2. Applicants' arguments filed March 15, 2005 have been fully considered but they are not persuasive.

3. In response to applicants' arguments against the references individually (i.e. pages 9-10 argues that each of the Cox, Salinger and Dent references do not compare the test signal before and after being fed to an amplifier,) one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

4. In response to applicants' argument that the combination of Cox, Salinger and Dent references does not disclose the limitation of comparing the test signal in the mixed down signal with the test signal in the modulated signal to obtain the amplifier transfer property, trainer 131 in Cox et al. receives the exact modulated signal to be

transmitted and the signal to be transmitted in order to ensure that the predistorter correctly compensates for the distortion caused by the power amplifier. (See column 6, lines 5-15) In order to compensate for the distortion caused by the power amplifier, it is inherent or implicit that the input signals to trainer 131 are compared to determine the distortion and therefore, the necessary compensation. Furthermore, Salinger discloses using a test signal (see column 7, line 18-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Salinger teaching of using of a test sequence instead of the modulated signal (i.e. the output of 103" in Figure 1 of Cox et al.) in the linear transmitter of Cox et al. in order to have greater flexibility in deciding when to adjust/adapt the predistorter and for adapting to the operating environment of the transmitter. (See Salinger, column 7, lines 28-30) The combination of Cox et al. in view of Salinger results in amplification of the test sequence and then comparison of the original test sequence with the transmitted test sequence (via trainer 131) thereby reading on the claimed invention.

5. In response to applicants' argument that the references fail to show certain features of applicant's invention (see the last paragraph starting on page 9), it is noted that the features upon which applicant relies (i.e., known test symbols) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

6. In response to applicants' argument on page 11 that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

7. In response to applicants' argument on page 11 that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Salinger provides motivation. (See column 7, lines 18-36). Furthermore, motivation can be established by the knowledge generally available to one of ordinary skill in the art.

8. In response to applicants' argument in the last paragraph on page 11 that the Office Action never made a finding regarding the ordinary skill level in the art at the time the claimed subject matter of the present application was made, the court has held that

Art Unit: 2637

an invention may be held to have been obvious without a specific finding of a particular level of skill where the prior art itself reflects the appropriate level. *Chore-Time Equipment, Inc. v. Cumberland Corp.*, 713 F.2d 774, 218 USPQ 673 (Fed. Cir. 1983). See also *Okajima v. Bourdeau*, 261 F.3d 1350, 1355, 59 USPQ2d 1795, 1797 (Fed. Cir. 2001). In this case, the Cox et al., Salinger and Dent et al. references reflect the appropriate level of one of ordinary skill in the art.

### ***Claim Rejections – 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 13-15, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cox et al. (US Patent 5,732,333 cited in the Office Action mailed December 28, 2004) in view of Salinger (US Patent 6,252,912 B1 cited in the Office Action mailed December 28, 2004), and further in view of Dent et al. (US Patent 5,262,734 cited in the Office Action mailed December 28, 2004).

11. As to **Claim 13**, Cox et al. discloses a transmitter for sending a signal over a wireless channel (figs. 1 and 2), comprising (col. 3, line 66 – col. 4, line 15; col. 6, lines 2948) a modulator (digital modulator 103) for modulating the signal to produce a modulated signal; a predistorter (predistorter 107) for predistorting the modulated signal

according to an amplifier transfer property (col. 5, lines 3-6 ) in order to produce a predistorted signal; a mixer (converter 112) for converting the predistorted signal from a baseband frequency (col. 4, line 50) into an intermediate frequency (col. 5, line 16) in order to produce a converted signal (col. 5, lines 13-17); an amplifier (Power Amplifier 115) for amplifying the converted signal in order to produce an amplified signal (col. 5, lines 33-36); an antenna (antenna 117) for sending a first portion of the amplified signal (col. 5, lines 35-36); a mixer (combination of 123-124-125-229) for mixing a second portion of the amplified signal down from the intermediate frequency to the baseband frequency in order to produce a mixed-down signal (col. 8, lines 35-38); a measurement module (trainer 131) for comparing the mixed-down signal with the predistorted signal to determine the amplifier transfer property and for notifying the predistorter of the amplifier transfer property (col. 6, lines 5-21; col. 8, lines 43-50).

However, Cox et al. is silent on a signal generator for generating a test signal; and an input element for inputting at preset times the test signal into one of the modulated signal, the predistorted signal, and the converted signal, wherein the measurement module compares the test signal in the mixed-down signal with the test signal in the one of the modulated signal, the predistorted signal, and the converted signal to obtain the amplifier transfer property.

In disclosing an adaptive predistortion system (Fig. 1), however, Salinger teaches that the modulated symbol stream is first input to a predistorter with memory (col. 7, lines 10-11) before being amplified by a power amplifier (power amplifier 18) for transmission; then at preset times (from time to time; col. 7, line 19) a test signal

(sequence of symbols; col. 7, line 20) is input into an amplifier (from the output of the predistorter with memory, by means of switch 20; col.7, lines 19-22), and a modulated signal (the test sequence can either be sent as a continuous symbol stream that occasionally interrupts the data stream, or preferably as selected symbols that are part of the overhead bits that accompany each frame of data; col. 7, lines 25-28) by an input element [by implication]; wherein these test symbols are extracted from the power amplifier output and compared with the test signal in the modulated signal to obtain the amplifier transfer property (the measurements are used to readjust the symbol position mapping in the memory of the predistorter; col. 7, lines 32-34; the predistorter 14 functions to compensate for the nonlinear effects of the power amplifier 18; col. 7, lines 15-18).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Salinger into the method of Cox et al. because it would provide for a simple alternative to the adaptive predistorter in measuring the nonlinear distortions caused by the power amplifier.

As to signal generator, Dent et al. discloses (Fig. 1) a generator for generating test signals (test signal generator 21; col. 3, line 26) which in test mode is supplied to (by means of switch 31 [an input element]) an amplifier (amplifier 10 that amplifies the signal before transmission), wherein a portion of the amplified signal is fed back to a measurement unit (distortion analyzer 27; col. 5, line 18) that analyzes the distortion caused in the amplifier and provides a predistorter (predistortion circuit 28; col. 5, line 20) with the identified amplifier transfer function (col. 5, lines 16-24 and lines 37-48).



Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further incorporate the teachings of Dent et al. into the method of Cox et al. and Salinger because it would provide for means for generating the test signals needed for measuring the distortion effect of the amplifier.

12. As to **Claim 14**, the recited features of the claimed transmitter are merely one instance of the same features of the subject matter mentioned in the rejection of Claim 13 above and are similarly analyzed. (See Salinger, column 7, lines 25-28)

13. As to **Claim 15**, Cox et al. also discloses a DSP based implementation, wherein the predistorter is loaded (stores) with a set of constant values (i.e. the predistortion values) (See Cox et al., col. 10, lines 46-54).

14. As to **Claim 19**, the claimed method for sending a signal over a wireless channel and all recited features of the claimed method correspond with subject matter mentioned in the rejection of Claim 13 above, similarly applicable hereto.

15. As to **Claim 20**, recited features of the claimed method are similarly analyzed as claims 13 and 14 above.

16. As to **Claim 21**, the recited features of the claimed method correspond with subject matter mentioned in the rejection of claims 13 and 14 and 15 above, similarly applicable hereto.

17. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cox et al. (US 5732333) in view of Salinger (US 6252912 B1) and Dent et al. (US

5262734) as applied to Claim 13 above, and further in view of Mojoli et al. (US 4615040).

18. As to **Claim 16**, Cox et al., Salinger, and Dent et al. are all silent on the modulator performing a differential phase modulation. In disclosing high speed data communications system, however, Mojoli et al. teaches the predistortion (col. 7, lines 8-10) of the modulating signals for compensation adjustment for characteristics of amplifiers (col. 9, lines 36-42); and that the arrangement could be applied to modulating schemes such as differential phase shift keying (DSPK; col. 9, lines 50-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Mojoli et al. into the method of Cox et al. (in view of Salinger and Dent et al.) because it provides for high speed data communication system with a predistortion scheme for compensation of the distortion caused by the power amplifier in transmitter.

19. As to **Claim 17**, the recited feature of the claimed transmitter corresponds with subject matter mentioned in the rejection of Claim 16 above, similarly analyzed.

20. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 13 above, and further in view of Brajal et al. (US Patent No. 5,598,436). The references as applied to claim 13 above disclose the claimed invention except for configuring the transmitter to transmit OFDM signals.

Since Brajal et al. discloses predistortion to compensate for signal distortion caused by amplifiers in OFDM transmitter (see abstract and column 1, lines 6-10), it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Brajal et al. with that of Cox et al. in view of Salinger and Dent et al. in order to reduce the signal distortion in an OFDM transmitter.

***Allowable Subject Matter***

21. Claims 18 and 22-26 are allowed.

***Conclusion***


22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

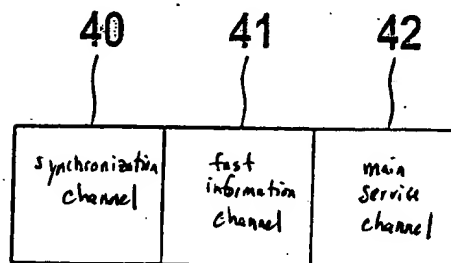
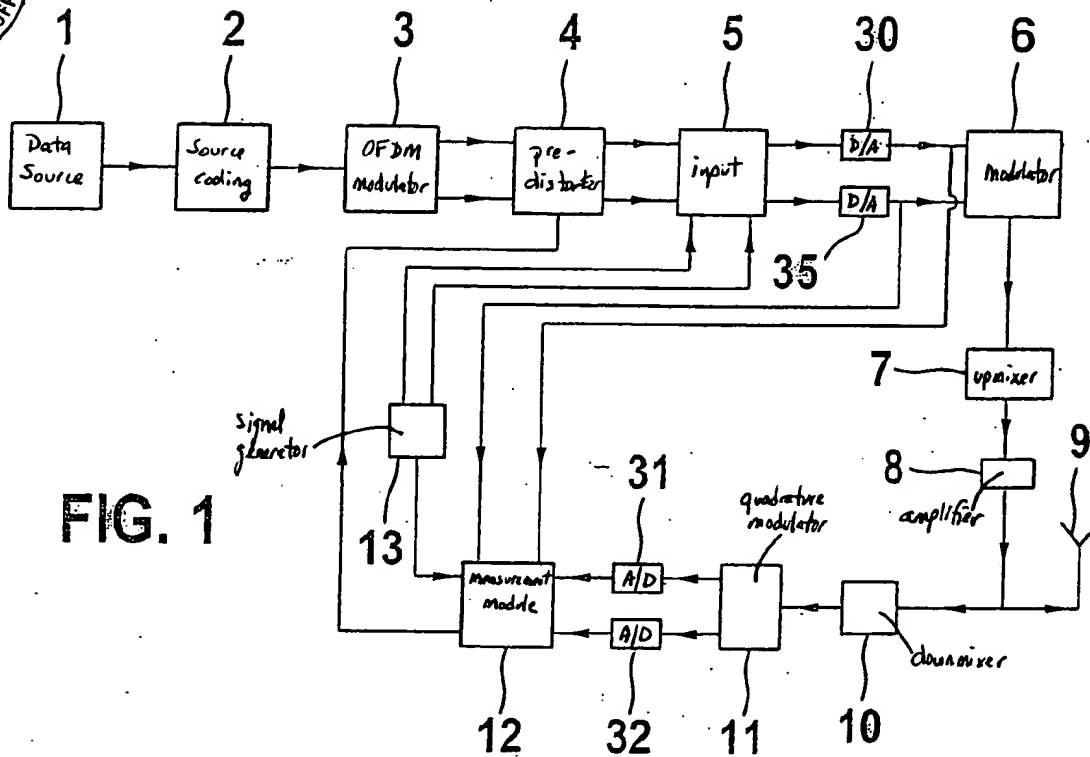
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Betsy L. Deppe whose telephone number is (571) 272-3054. The examiner can normally be reached on Monday, Wednesday and Thursday (8:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272 - 2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Betsy L. Deppe  
Primary Examiner  
Art Unit 2637



**FIG. 2**

2/2



FIG. 3

